

REMARKS/ARGUMENTS

Claims 1-18 and 25 have been canceled. Claims 19-24 have been withdrawn. New Claims 26-44 reflect original Claims 1-18 and 25 without reference numerals. Of these claims, Claims 26 and 44 are independent.

The Examiner's Rejection:Specification:

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. It is noted that the claimed invention is directed solely to a method. The examiner suggests amending the title to reflect same.

Claim Observations:

It is noted that the claims contain reference characters corresponding to elements enclosed in parentheses. While they are acceptable per MPEP 608.01(m), the claims are not being limited to the reference characters and the use of same has no effect on the scope of the claims. It is suggested that applicants remove the extraneous reference characters to avoid any potential confusion.

Rejection under 35 U.S.C. 112:

Claims 1-8, 25 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

In Claim 1, the phrase "determining a theoretical value" is deemed nonenabling as the specification does not provide any guidance as to how one does this. It is noted that the theoretical value as presently recited can be anything. As a result, determining a theoretical value appears to be irrelevant. For example, one skilled in the art can assign a value of 1 or 10 or 100 or 1000. Are all values acceptable? It is not the examiner's intention to be

condescending about this issue but wishes merely to have the applicant's limitation clarified. The same issue applies to Claim 25.

In Claim 1, the phrase "determining a first new value for the compensation factor" is deemed nonenabling as to how one skilled in the art would determine a new compensation factor. For example, if the initial value were 100, how does the skilled artisan decide on the new value? Could it be 10 or 1000? If it can be any value, what is the purpose of determining the initial value? The same issue applies to determining a second value. Again, as stated above, it is not the examiner's intention to be belligerent about this issue. The same issue applies to claim 25. Clarification and appropriate amendments are requested.

Claims 1-8, 25 are rejected under 35 U.S.C, 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 1, the phrase "measuring a pressure of the viscous material" is deemed vague and indefinite as to what said phrase means. The examiner understands how one can measure the temperature of a material. But how does one measure the pressure of a material and is it different from the pressure of the system? Clarification is requested.

In Claim 1, the phrase "determining a theoretical value" is deemed vague and indefinite. It is noted that the theoretical value as presently recited can be anything. If the applicant intended for this, applicant should say so on the record and this rejection will be withdrawn. If not, however, any guidance as to what this theoretical value is should be incorporated in the claim. The same issue applies to Claim 25.

In Claim 1, the phrase "determining a first new value for the compensation factor" is deemed vague and indefinite as to what said phrase means. How does one determine a new value? Clarification is requested. The same issue applies to Claim 25.

In Claim 8, the phrase "establishing a cracking pressure" is deemed vague and indefinite as to what said term means. It is not clear what the cracking pressure has to do with the dispensation of the viscous material. The same issue applies to "establishing a linearity factor" in Claim 9.

Rejection under 35 U.S.C. 103(a):

Claims 1-18, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Putt (6,329,013). Putt discloses a method for dispensing a viscous solution by utilizing a dynamic flow control system which consists of a dosing system controlled by means of a computer unit and consists of at least one pressure part, a material container, a nozzle, and a pressure member displaceable in the material container (col.1 lines 5-12). In one embodiment, a test sequence is run before the dispensing operation and during the test sequence data is collected mainly about the dosing unit including the pressure within at least one pressure part, the position of the pressure member of the dosing unit, and a material feed pressure by the computer unit, a set value is determined for a material feed pressure and a material flow substantially with regard to the collected data and the material is dispensed with regard to the set value for flow controlled by means of a regulator, as a direct value of the set flow value and at the same time the application flow is controlled (col.3 lines 33-45). It should be noted that Putt specifically teaches of determining a set value for a material feed pressure and a material flow substantially in respect of collected data and applying the material with regard to the set value by controlling the dispensed flow (lines 35-40). Also, the computer unit can measure the volume of the dosing unit from a sensor and regulate the pressure with the pressure member (lines 40-45). The control unit 15 is arranged with a number of inputs and outputs, for collecting data as well as for generation and transmitting control signals and may be controlled by the robot or another external control unit (col.4 lines 25-42) and controls a regulator 16 utilized to control the material flow (col.4 lines 43-61). The reference teaches the use of a pulse transducer (col.4 lines 5-19). However, the reference fails to specifically teach a compensation factor.

It is noted that the reference clearly teaches of measuring a value and comparing it with a set value and modifying a deposition parameter as a result and repeating. One skilled in the art would realize that the claimed compensation factor is merely what the computer would be assigned a value and results in an additional step with a more precise way of obtaining a specific parameter. It would have been obvious to utilize a compensation factor with the expectation of obtaining a more precise process of dispensing a material.

The limitations of Claims 2-18 and 25 have been addressed above.

Applicants' Remarks:

Applicants amended the title of the patent application to read METHOD OF CONTROLLING DISPENSING SYSTEM. Applicants believe this amendment reflects the Examiner's request.

Applicants added new Claims 26-44 to eliminate the reference numerals. Applicants respectfully submit that the clarifications in their remarks set forth below in contrast to the cited prior art more clearly set forth Applicants' novel invention. Applicants respectfully submit that these clarifications and the amendments not only overcome the Examiner's rejections under 35 U.S.C. 112, first and second paragraph, but also the rejection under 35 U.S.C. 103(a) as being unpatentable over Putt (6,329,013).

The Putt patent uses the doser to detect the material flow. In sharp contrast, Applicants' invention uses a flow meter to do the same.

With the doser of Putt, it is possible to measure accurate flow rate value at each control interval. With Applicants' flow meter, the information is obtained at the rate flow pulse generated by the flow meter.

Putt monitors the piston 25 location periodically, at a fixed interval, using the information from the potentiometer 26. With Putt, it is possible to calculate the displacement of the doser for the last interval, and therefore to calculate the accurate (average) flow rate for the last interval where (average flow rate = dispensed volume divided by the time interval).

Applicants' invention, on the other hand, uses the flow meter to detect the material flow. A typical flow meter has gear teeth that pass by a proximity switch as the material flows through the meter, so that the electric pulses may be generated by the proximity switch. However, the flow rate often used for the robotics dispensing application may not generate the pulses as frequently as it is desired. This situation is illustrated in Applicants' Fig 4. In this figure, the interval (T1, T2) of the pulses from the flow meter is much longer than the system control interval (t1). Also the pulses will NOT come at the fixed interval, but at the frequency that depends on the material flow rate.

With this situation, the calculated flow rate from the flow meter pulses will NOT reflect the instantaneous material flow rate, but it only indicates the average flow for the last pulse interval (that may be quite longer than the system control interval). Such flow rate information cannot be used as the feedback signal for the closed loop flow rate control.

In order to overcome the drawback mentioned above, Applicants' invention uses the pressure value detected by the pressure sensor 36 to calculate (estimate) the instantaneous flow rate ("theoretical dispensing rate" in the document). The controller 48 in Fig 1 reads the pressure information from the pressure sensor 36 at every control interval (ti). Based on the Pressure-Flow Rate characteristics as described in paragraph [0035], the controller 48 can calculate the theoretical flow rate/volume, which is the most reliable estimation of the instantaneous flow rate/volume at that point. This flow rate and volume value may be used for the closed loop flow control as described in Fig 1. Therefore, Applicants' invention differs from Putt, where Putt does NOT use a material pressure sensor and Applicants' invention uses the material pressure sensor.

Putt further differs from Applicants' novel invention where Putt uses a "test sequence" to get the Pressure-Flow relationship (Fig-2), and the relationship will not be updated until the next "test sequence". Applicants' invention does not require a "test sequence", rather it establishes and continually updates the Pressure-Flow relationship (the equation in paragraph [0035]) while the system is run. Theoretically, the initial value for the coefficients (b and f in the said equation) should be set based on the viscosity of the material, but it can be any arbitrary value as the system will instantaneously start adjusting these values as soon as system starts dispensing the material. Every time the pulse 34 from the flow meter 32 arrives to the controller 48, the pressure-flow relationship is updated.

Applicants respectfully submit that newly presented independent Claims 26 and 44 are allowable over the cited art. Remaining Claims 27-43 depend from Claim 26 and are, therefore, also allowable. Such action is respectfully solicited.

The foregoing amendments are taken in the interest of expediting prosecution and there is no intention of surrendering any range of equivalents to which Applicants would otherwise be entitled in view of the prior art.

By amending the application, Applicants do not concede that the patent coverage available to them would not extend as far as the original claims. Rather, Applicants intend to file a continuation and/or divisional application to pursue the breadth of the claims as filed. Applicants believe that the Examiner has not made a sufficient showing of inherency of the teachings of the asserted prior art, especially given the lack of teachings in the cited references of the properties that Applicants have recited in their claims.

Further, by the present amendment, it does not follow that the amended claims have become so perfect in their description that no one could devise an equivalent. After amendment, as before, limitations in the ability to describe the present invention in language in the patent claims naturally prevent the Applicants from capturing every nuance of the invention or describing with complete precision the range of its novelty or every possible equivalent. See, Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 62 USPQ2d 1705 (2002). Accordingly, the foregoing amendments are made specifically in the interest of expediting prosecution and there is no intention of surrendering any range of equivalents to which Applicants would otherwise be entitled.

CONCLUSION

In view of Applicants' amendments and remarks, the Examiner's rejections are believed to be rendered moot. Accordingly, Applicants submit that the present application is in condition for allowance and request that the Examiner pass the case to issue at the earliest convenience. Should the Examiner have any question or wish to further discuss this application, Applicants request that the Examiner contact the undersigned at (248) 960-2100.

If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent the abandonment of this application, please consider this as a request for an extension for the required time period and/or authorization to charge our Deposit Account No. 50-3156 for any fee which may be due.